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ABSTRACT

The latest important event in the history of educational testing in Japan was the establishment of the National Center for University Entrance Examination (NCUEE) in 1977. The entrance examination system consists of two stages. The first stage exam is the Joint Achievement Test (JAT) which is jointly administered by national and local public universities throughout Japan on the same days. The second stage exam is one which is carried out by each university. This stage is locally designed in view of the admission policy of an individual university. This is a report on the four years' (1977-82) experience of the administration of the nationwide JAT. It includes: (1) establishment of the National Center for University Entrance Examination, (2) the essential features of the new entrance examination system, (3) merits of the new system, (4) criticism regarding the new system, (5) technical problems of JAT, and (6) concluding remarks. Some statistical results announced from the National Center for University Entrance Examination are also included. (Author/PN)

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A New Development of University Entrance Examination in Japan

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and

The National Center for University Enatrance Examination

U.S. DEPARTMENT OF EDUCATION
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1. Establishment of the National Center for University Enctrance Examination

Educational and psychological tests can be used not only for selection but also for placement and promotion in business, for assessment of vocational fitness in guidance, mental diagnosis in hospitals, and so forth. However, most of test use are for selection in Japan, which include enployment of businesmen and government officials, as well as admission to higher education.

No one but exception can avoid to take tests whenever he or she wants to have higher education. University entrance examination is a serious matter for all youth and often raises social problems.

Table 1 indicates the increased number of students who enrolled in higher education in Japan from 1955 to 1980. Educational instituions have been enlarged in number for these 25 years. However, the number of applicants has also tremendously increased. On entering upper-school, competitive examinations are made and "testing" has taken an important role at each stage of selection.

Insert Table 1 about here

Such keen competition, especially, in the university entrance examination has been a target of critics. The points at issue are summarized as follows:

1) Applications for admission concentrate their efforts upon a small number of elite universities. Competition for matriculation becomes overly severe.

2) There are cases where applicants leave their success or failure in the examinations to chance, and also cases where excessively difficult or deceptive questions have often appeared in examinations.

3) Students wishing to enter college spend a large part of their high school education merely acquiring techniques for taking the entrance examinations.

The latest monumental event in the history of educational testing in Japan was the establishment of the National Center for University Entrance Examination (NCUEE) in 1977. All the national universities, as one body, agreed with the joint administration of scholastic achievement test under the management of NCUEE in order to answer the criticism.

The first joint administration of achievement test was held in January, 1979, with participation of public universities. This 1982 is the fourth year of administration.

2. The Essential Features of the New Entrance Examination System

a) Two stage examinations

The new entrance examination system consists of two stages. The first stage-exam is the Joint Achievement Test (JAT) which is jointly administered by national and local public universities thoughout Japan on the same days. The second stage-exam is the one which is carried out by each university. This stage of exam is locally designed in view of admission policy of individual university. The final selection is made by the integrated use of informations from the two stages of examination and other high school records, recommendation, etc.

b) The national examination

This system is only applied to the national and the public universities. Although participation of private universities to this system is encouraged, only one joined this program this year. Since each private university has its own history and has the different policies for student admission, such a unified treatment is not necessarily welcomed by all the private institutions.

c) The scope and the level of questions

The scope and the level of questions posed in the JAT corresponde to conpulsory subjects in upper secondary school. Applicants have to take seven achievement tests from five

subject areas taught in normal high school, which are national language (Japanese), mathematics, two subjects from social studies, two from natural sciences, and finally a foreign language.

Some lower level achievement tests, general mathematics, basic sciences, and English A, are supplied for students from vocational high school who took courses under different curriculums. But applicants who took normal courses under the standard curriculums are not permitted to choose this sort of achievement tests.

Table 2 is the list of tests used and the number of applicants who took them in the past four years.

Insert Table 2 about here

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d) One time examination in a year

The JAT is carried out once a year on two consequtive days in the middle of January. It was held on January 16th and 17th this year. A week later, the supplementary test was given to 113 persons who could not take the regular test by sick, injury, or some other valid reasons. The re-examination was also given to 26 persons who could not take the rugular test by traffic trouble in snow.

e) A complete objective test

The JAT is a completely objective test. More than 1.75 million answer sheets were read by high-speed optical scanner (W301 of Westinghouse) and scored by electronic computers (FACOMM-180IIAD, Fujitsu, Japan) within three weeks.

f) The self-scoring system

The uniqueness of the JAT is perhaps that all the questions given and the right answers are opened to the public, through mass media, after the test is over. Each examinee is allowed to take home his test booklet after examination. Each examinee is thus able to count his own score according to the announced key codes.

About three weeks later when machine scoring is done, the center announces the distribution of total test scores and the means and the standard deviations of each sub- and total test scores over all applicants (See Figure 2, Table 4 and 5).

Using this information, each entrant finally determines his own university to apply for and then takes the second-stage examination which is held by each individual university. No applicants can apply more than one national unversity simultaneously.

g) The second-stage examination

In early March, individual university carries out the second-stage entrance examination for those who have applied, since academic year begins in April in Japan. In the

second-stage exam, each university shall as needed, give short essays, interview and examination in practical skills in addition to or in place of the written examination. The achievement tests in the second-stage exam correspond to electives which the student chose in upper seondary school.

They evaluate the applicant's ability, aptitude, and other traits that could not be assessed by the objective test given in the first-stage examination.

Admission is made by consolidating the results of the first- and the second-stage examinations, high-school records and/or recommendation.

Applicant's JAT scores are informed directly from NCUEE to each university upon request. No information is given to an individual applicant from NCUEE.

Figure 1 illustrates procedures for obtaining admission to universities, and junior colleges, in our school system.

Insert Figure 1 about here

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3. Merits on the New System --- a Retrospect of Four Years' Experience

This year we had the fourth administaration of the Joint Achievement Test. The four years of experience have yielded

several issues on the result of the new system. The favorite points are as follows:

a) Improvement of test questions

Generally speaking, the contents of question have been welcomed by both high school teachers and students. The test level conforms to the curriculum of upper secondary schools. The question appeared in the past examinations was often so difficult or so deceptive above the level of normal curriculum that they cause distortion of high school education. At least the questions in the JAT have been improved in this respect.

b) Careful application for university

Applicants avoid too much risk on the keen competition under the new system. In Table 3, we can compare the ratio of the number of applicants to the new enrollments in the national univerisity before and after the new examination system was introduced.

Before the new system was introduced, the number of applicants was about six times as many as the number of admission. After the new system was taken, the ratio was decreased down to about three times. Under the old system, each applicant had a chance to apply for two national universities but only one is allowed in the new system. Then he became careful in making decision. Since each applicant knows his own JAT score by self-scoring as mentioned in previous section, he can lessen the risk of failure of admission by applying for an

adequate university for him.

We have a criticism on this, however, that this phenomenon should not be regarded as a good evidence of the new system. The reason will be discussed in later section.

Insert Table 3 about here

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c) Elaboration of the second-stage examination

Admission staff of individual university have time to devote themselves in improving their own second-stage examination, which is welcomed for the multi-assessment of applicant's eligibility for taking higher academic education. Some unviversity tries to give unique questions in essay examination for assessing applicant's originality. Some other universities emphasize interview or observation of practical skills of applicants.

However, we are still in a trial and error stage of the new exmanination system. More elaboration in the second-stage exam is needed.

4. Criticism toward the New System

As to the assesment of fundamental scholastic achievement,

the first-stage examination, or the JAT is welcomed by most national universities. But there also exist critical issues among examinees and in the public. The followings are some of them.

a) "Wagiri-gensho", a sliced-cut phenomenon by means of a single scale

The announcement of the distribution of JAT score gives a valuable information to the applicants on their position along the single scale made throughout Japan. In other word, the JAT score yields a national standard scale on scholastic achievement of upper-secondary school (See Fig. 2)

Insert Figure 2 about here

Advent of high-speed computer has out-side commercial bussiness estimate on possibility of applicant's success. They collect self-scored data and the names of going-to-apply unviversity from entrants within a short period between the day tested and the deadline date of final application to be submitted. They calculate the probability of each applicant's success taking account of his competitor's scores and inform this to the applicant who paid fee for service. Thus given this information, an individual entrant can estimate how difficult the university he wants to enter is, even before he takes the

second-stage examination.

Consequently, a single rank-order of difficulty over the national universities is formed along the JAT scale. By such a self-selecting application, the homogeneous group of applicants in terms of JAT scores come to apply for the same university. Journalism named this a "Wagiri-gensho" which means a sliced-cut of applicants within a narrow range of the scale.

They decide their university to go only by the relative position where they stand on the scale without considering their vocational interest and fitness or without firm plan on their future life.

This tendency would not decease even if the announcement of JAT score distribution is stopped, because commercial business can do this by their own. They can independently collect scores and calculate statistics through mutual self-reports from the huge amount of entrants who eager to know their position on the scale.

b) Heavy load on preparation

This new entrance examination system is only applied to the national and the public universities. Only one-fourth of the entrants of the same age population go to the national or the public universities. The rest go to private ones (See Table 3).

Most private universities still do examinations in traditional ways. The contents of scholastic examination are usually restricted within two or three subject areas and the level of achievement in famous university is set up at

excessively high because of keen competition. The JAT, on the other hand, is a comprehensive test which covers over seven subject areas in upper secondary school.

As only one application of national university is permitted, many entrants apply for the combination of both national and public universities, national and private universities or the combination of all. Thus to prepare more than two examinations with different style impose too much heavy load of work on entrants. Not a few students give up to take both types of examinations at early stage of upper-secondary school, and they concentrates their efforts on preparation for either national (includes public) or private university only. The former requires comprehensive tests covering wide areas of subjects and the latter does deep knowiege on few but selected subject areas. They require different kinds of preparation. This is not a healthy state for normal upper-secondary education.

So far is some illustration of troubles with which we have in the new system. However, they are not necessriiy due to the new system only. Real problem originates from the historical and social system existed in Japan and its reformation will be a great task. The reform of the examination system can only solve a part of the whole complexities.

5. Some Techincal Problems on JAT

Looking at Table 4 and 5, we notice statistical features of JAT. The followings are something related to technical problems.

a) Heterogeneous difficulty among subtests

The mean scores of subtests varies each year as seen in Table 4. "Ethics and society" and "politics and economics" are said relatively easy for preparation, compared with "history of Japan" and "history of world". Therefore, as seen in Table 3, the numbers of examinee who chose "ethics and society" and "politcs and economics" have increased from 1979 to 1981. On the contrary, the number of applicants who chose the histories decreased year by year from 1979 to 1981. Then joint taking of "ethics and society" and "politics and economics" was prohibited from 1982. (As to geography A (general) and B (local geography), no joint taking has been permitted from the begining of this system.)

Insert Table 4 about here

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b) Heterogeneous dispersion among subtests

The hetrogeneity of dispersion is also found among subtests. As seen in Table 5, the standard deviation of

mathematics is nearly twice as much as Japanese language. The standard deviations of tests in social studies are generally smaller than those in natural sciences.

It is well known to test specialists that variability of standard deviations make diffirent contribution to the variance of total score. Adustment of difficulty and dispersion among subtests may be resolved through the standardization of subtest scores, in case that the groups of examinees are regarded as unidimensionally scattered along a sinlge scale. However, different subtests are supposed to measure different sorts of quality in each. A simple adjustment, by a linear transformation for instance, along a single scale has not taken consensus of all.

Insert Table 5 about here

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c) Equating problem among elective tests.

The above argument naturally leads to the equating problem among elective tests who chose diffent subtests in the same subject area. In view of fair competition, a simple composit of raw scores may yield unfair outcomes. However, no unified technical treatment by the aid of the national center has taken yet, rather they left it as the matter of decision in each university. How to use the JAT raw-score and how much weight

should be placed on the two stages of examination is left on the admission policy of individual university. Differential weighting which takes account of speciality is recommended.

6. Final Words

I have briefly introduced a new system developed in university entrance examination appeared in Japan. We do not stand yet on the time of evaluation whether the new system was successful or not. We need more experience of trials as well as a scientific research. A research division was founded in the National Center. It is the first national organization purported scientific research on examination. There are twelve staff members now and future research outcomes are expected.

Testing problem is not only a technical matter but also a matter of social demands. It is controlled by comtemporary views of society on testing. The role of testing will also change in the progress of time. The best solution at one time will not be the case in another time. We have to be flexible to the change of social needs. I hope I'll be able to report the success of this system in next meeting.

Table 1 The number of new enrollments in Universities and Junior Colleges, 1955-1980

Year	University	Junior College	Ratio of enrollment to the same age group Univ.	Jun Col.
1955	132,296	37,544	7.9%	2.2%
1960	162,922	42,318	8.2	2.1
1965	249,917	80,563	12.8	4.1
1970	333,037	126,659	17.1	6.5
1975	423,942	174,930	26.7	11.0
1980	412,437	178,215	26.1	11.3

Source: Report of the Ministry of Education, Science and Cutiure, 1981

Table 2 The number of applicants who took the Joint Achievement Tests

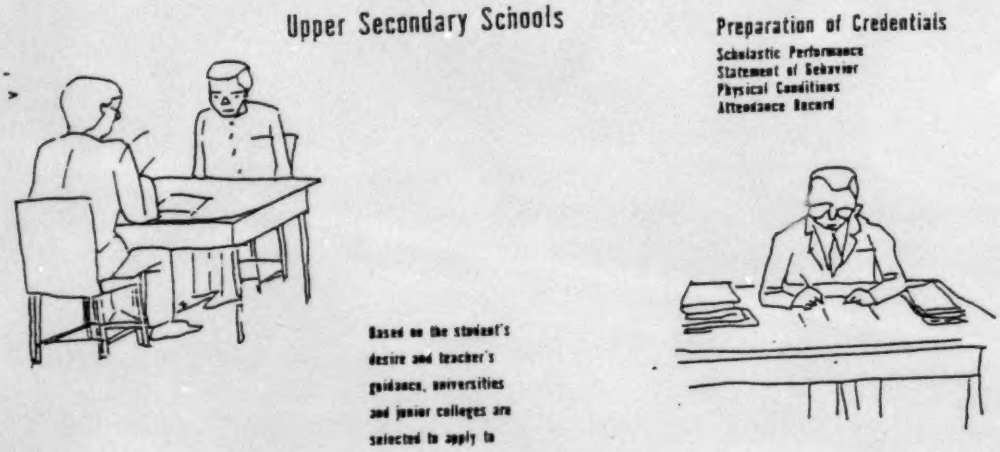
Subjects	Year 1979	1980	1981	1982
1. National Language (Japanese)	327,140	333,026	340,614	334,118
2. Social Studies	327,140	333,026	340,614	334,118
Ethics and Society	72,350	120,039	165,668	134,737
Politics and Economy	142,710	178,394	242,053	171,761
History of Japan	192,039	155,368	117,116	152,116
History of World	159,531	128,729	88,633	98,654
Geography A(*)	51,714	47,451	32,491	57,646
Geography B	35,494	35,925	35,169	53,212
3. Mathmatics	327,140	333,026	340,614	334,118
Mathematics I	326,477	332,766	340,317	333,852
Gen. Mathematics(**)	54	28	18	22
4. Sciences	327,140	333,026	340,614	334,118
Physics	184,568	178,844	164,844	142,728
Chemistry	265,323	259,056	256,613	239,397
Biology	153,742	163,090	180,421	187,294
Earth Sience	49,622	64,582	78,943	98,527
Basic Sciece(**)	159	107	115	92
5. Foreign Language	327,140	333,026	340,614	334,118
English A(**)	4,031	3,467	3,222	2,734
English B	321,893	328,538	336,362	330,422
German	303	331	424	346
French	192	222	234	235

(*) "Geography A (general)" and "B (local)" cannot be taken jointly. "Ethics and Society" and "Politics and Economics" cannot be taken jointly in 1982.
(**) "General Mathematics", "Basic Science", and "English A" are allowed only to the applicants from vocational high school.

Source: Report of the National Center for University Entarance Examination 1979,1980,1981,1982

Fig. 1

PROCEDURES FOR OBTAINING ADMISSION TO UNIVERSITIES AND JUNIOR COLLEGES


Upper Secondary Schools
Preparation of Credentials
Scholastic Performance
Statement of Behavior
Physical Conditions
Attendance Record
Based on the student's desire and teacher's guidance, universities and junior colleges are selected to apply to
Application
Sending of Credentials
Application
Entrance Examination
The "Joint Achievement Test"
The Second-Stage Entrance Examination
Entrance Examination
Universities and Colleges
Determination of Successful Applicants by Entrance Examination Committee in Each Institution
National and Local Public Universities
Private Universities and All Junior Colleges

Note: In 1978, 49% of universities and 67%of junior colleges did not require a scholastic entrance examination for a certain number of the applicants recommended by principals of the upper secondary schools. 4%of the former and 8%of the latter admitted new entrants solely on the basis of credentials from the upper secondary schools.

Source: "Education in Japan", Ministry of Education, Science and Culture, 1978.

Table 3 Ratio of Applicants to New Enrollments on different affiliations

A : The number of applicants
B : The number of new enrollments
C : The ratio of applicants to new enrollments ((A/B)x100)

Year		National U.	C	Public U.	C	Private U.	C
Old system							
1975	A	452,687		104,767		2,199,245	
	B	75,479	6.0	10,673	9.8	337,790	6.5
1976	A	482,861		92,928		2,218,729	
	B	76,537	6.3	10,479	8.9	333,600	6.7
1977	A	504,808		94,424		2,358,662	
	B	78,323	6.4	10,718	8.8	339,371	7.0
1978	A	509,497		103.812		2,513,819	
	B	80,237	6.3	10,797	9.6	334,684	7.5
New system							
1979	A	270,741		69,899		2,456,046	
	B	82,533	3.3	10,578	6.6	314,524	7.8
1980	A	255,019		64,832		2,338,555	
	B	84,731	3.0	10,848	6.0	316,858	7.4
1981	A	224,682		66,539		2,299,709	
	B	85,422	2.8	10,805	6.2	317,009	7.3

Source : "The Joint Acheivement Test." The National Center for University Entrance Examination, 1982.

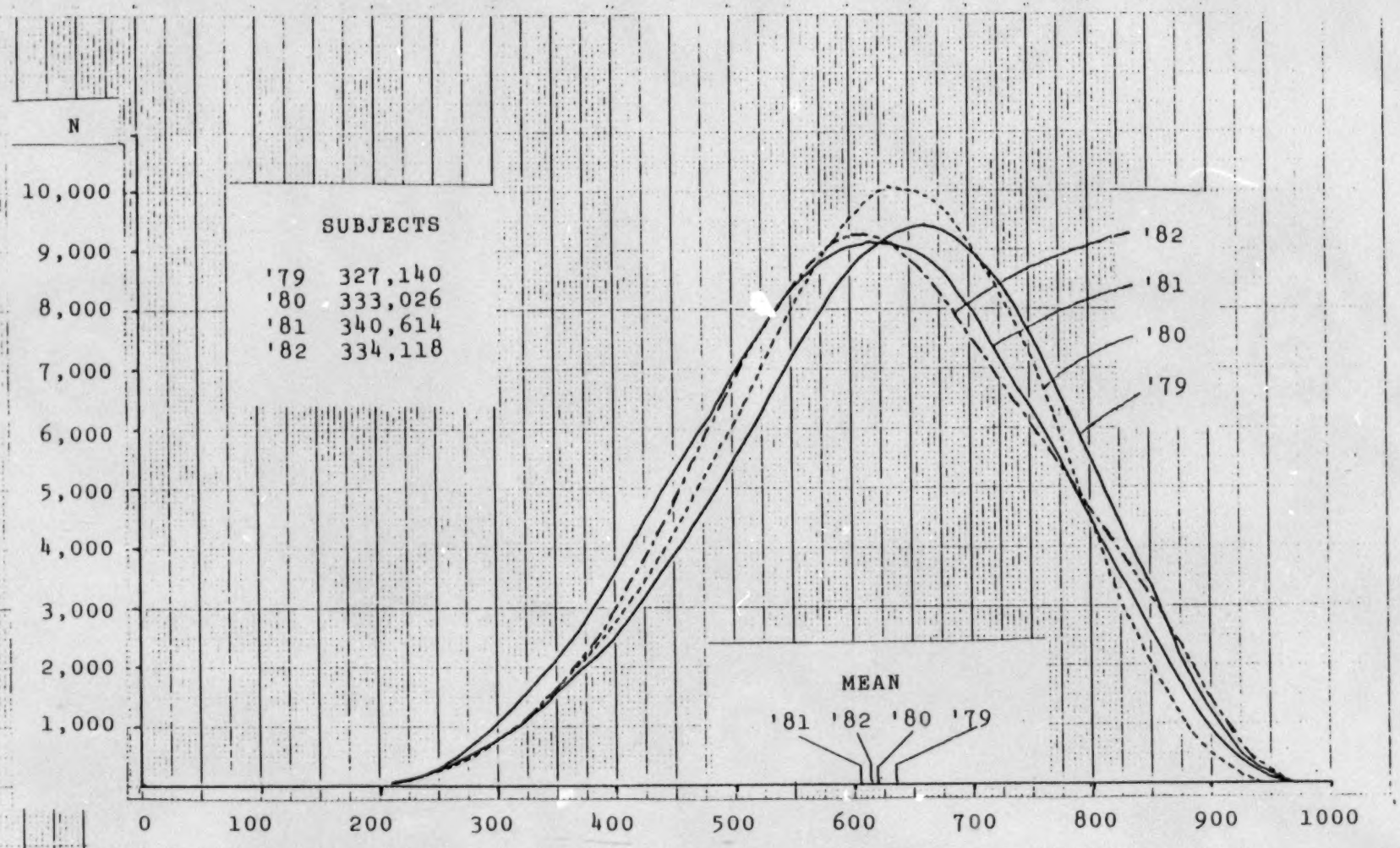


Fig. 2 Score Distribution of Joint Achievement Tests

Table 4 The Mean Scores of the Joint Achievement Test

Subjects	1979	1980	1981	1982
Total	636.07	617.36	607.12	620.00
National Language	131.98	138.74	132.86	134.93
Social Studies (Sum of Two)	115.74	120.61	127.97	115.26
Ethics and Society	61.83	61.29	71.88	62.19
Politics and Economics	58.09	73.42	60.64	50.20
History of Japan	54.01	51.92	62.10	56.18
History of World	57.21	53.73	61.04	62.83
Geography A	65.62	52.63	62.81	61.08
Geography B	62.18	62.08	64.73	60.96
Mathematics	151.62	146.38	123.34	120.91
Mathematics I	151.92	146.49	123.45	121.00
General Mathematics	59.63	51.25	37.67	64.55
Sciences (Sum of Two)	112.03	117.85	115.76	133.80
Physics	59.87	55.17	51.20	66.09
Chemistry	50.58	56.82	56.64	69.49
Biology	60.96	65.33	63.36	65.45
Earth Science	56.12	61.93	63.55	64.68
Basic Science	64.93	62.21	73.63	72.36
Foreign Language	124.70	93.79	107.18	115.09
English A	84.54	66.68	71.66	80.00
English B	125.49	94.18	107.64	115.53
German	121.94	112.55	102.06	104.89
French	116.66	102.59	112.46	112.90

Source: Report of the National Center for University Entrance Examination, 1979,1980,1981,1982

Table 5 The Standard Devations of the Joint Achievement Test

Subjects	1979	1980	1981	1982
Total Score	134.28	128.11	138.32	136.92
National Language	24.69	24.94	25.32	27.24
Social Studies (Sum of Two)	27.47	27.69	26.00	28.85
Ethics and Society	15.52	15.95	14.95	17.45
Politics and Economics	13.47	13.33	11.75	11.28
History of Japan	14.81	15.60	14.53	15.50
History of World	16.91	14.26	17.63	19.48
Geography A	13.07	11.73	13.62	15.41
Geography B	15.59	16.50	17.90	16.84
Mathematics	44.34	47.24	51.76	45.10
Mathematics I	43.88	47.09	51.65	45.00
General Mathematics	32.24	32.28	20.96	37.40
Sciences (Sum of Two)	39.51	29.89	34.63	32.14
Physics	24.62	19.27	17.94	22.85
Chemistry	21.89	14.41	18.97	15.76
Biology	19.76	17.54	20.48	15.33
Earth Science	18.55	17.46	19.57	17.43
Basic Science	24.78	22.51	28.60	23.41
Foreign Language	31.70	33.60	35.24	37.26
English A	32.06	30.93	34.52	33.92
English B	30.82	33.31	34.88	36.93
German	44.08	48.12	48.00	45.25
French	42.66	47.21	55.42	57.33

Source: Report of the National Center for University Entrance Examination, 1979,1980,1981,1982